1:Williams E,G-5 (1923-1925) 1930
OJ23 Orokaiva OJ23

varied, indeed, by occasional squalls that may do considerable damage among the luxuriant but flimsy vegetation. 132

The South-East season is perceptibly drier and much more pleasant than the North-West. This becomes especially apparent to the traveller who in the former season can make a good pace over excellent native tracks, but in the latter must do more than a little wading. A former *Annual Report* gives the following account of the Aiga country: 'The track between Bogi and Tamata has the reputation of being in bad weather the worst in the Possession. The greater part of it passes through flat country, intersected by sluggish creeks and pandanus swamps. After heavy rain it is flooded for miles waist deep.'[1] One may reasonably doubt whether the Aiga country is often deserving of this description; but making allowance for a little pardonable exaggeration on the part of one who had evidently met with unpleasant conditions, we may take his word for it that in bad weather the tracks are very wet. 132 487

The contrast afforded by the drier months of 'winter' may be striking. Sometimes a long spell of sunny rainless weather, with refreshing, almost chilly, nights may lead to a serious dearth of food, and compel the natives to supplement their diet with a variety of leaves, roots, and fern-fronds from the bush. Although such scarcity never reaches the point of famine it may nevertheless be serious enough. The drought has in fact far more terrors for the Orokaiva than the destructive flood. 132 731

Conditions of temperature remain fairly equable. The following are figures for the official year, 1924–5: 132

Station.	*Dry Therm.*	*Wet Therm.*	*Maximum.*	*Minimum.*
Buna	82·2	77·5	87·3	68·4
Kokoda	74·5	72·3	88·5	67·3
Ioma	77·4	74·4	91·5	72·9

Vegetation

By far the greater part of the Northern Division is covered by forest. Some of this has at one time or another been 137

[1] *Annual Report*, 1904–5, p. 5.

1:Williams E,G-5 (1923-1925) 1930
OJ23 Orokaiva OJ23

137 cleared for native gardens, some is still virgin, being distinguished by the presence of giant trees with spreading flanges or buttresses. The forest presents an infinite variety, with this important characteristic, that the variety is for ever repeating itself, so that a man who requires any particular product usually has not far to seek.

137 313 [411] With few exceptions the trees are soft-woods, and these supply easy material for canoes and much of the house-building. One or two varieties of hard-woods are used for spears, but these weapons as well as the wooden 'sword' are usually made from the tough and springy *Koropa* palm. Other palms provide the slats used in flooring; and the 137 pandanus, most useful of all, is valued for its fibre which is 314 twisted into rope, and for its broad leaves which are sewn together to form the sleeping mat. One variety is prized [267] for its fruit, a long red seed-cluster, which is boiled down to a porridge.

137 313 [262] One of the greatest natural assets of the Orokaiva is his sago. In the interior the palm is comparatively rare and each tree is carefully husbanded, but along the lower reaches of the rivers, where they are bordered by swamps of very great extent, the sago grows in a quantity which, as far as native wants are concerned, is probably inexhaustible. As a diet it is secondary to the taro, but among the river-dwellers at least it provides an unfailing resource in times of scarcity. The sago leaf thatches the house, and the midrib nowadays commonly forms the walls of the house. In the dismal swamps of the coast the *Nipa* palm furnishes another material for thatching, and the mangrove one of the most adaptable of native timbers.

137 262 Comparatively few fruit-bearing trees are found in the bush. The only exceptions of much consequence are the several varieties of bread-fruit, the *Okari* nut, and the tree called *Puga*. Mangoes are uncommon and of inferior quality, and of the numerous varieties of wild fig only one or two may be called edible. But there are numerous herbs, ferns, and tree leaves which always lend variety to Orokaiva cookery, and when scarcity prevails at the height of the South-East season may even become a stand-by. Indeed,

1:Williams E,G-5 (1923-1925) 1930
OJ23 Orokaiva OJ23

the various natural resources of the bush would probably enable the native to tide over a period in which the taro gardens failed completely.

Such clothing as he wears is made by beating out the bark of a *ficus* tree; his belt is plaited with thin strips of cane; his pipe is a tube of bamboo; his cheeks are streaked with a red paint obtained from a seed; his ready-made luggage-strap or the mooring cable for his canoe is a creeper withe or a length of rattan cane. These are only a few of the uses to which the Orokaiva, true forest-dweller that he is, may put the multifarious products of his environment. One cannot fail to be impressed by his wonderful familiarity with the forest—so perplexing to one who is not a woodsman—and with his extempore skill and resource in turning all its products to account.

Wide areas of the plain—though still but a small proportion of its total extent—are covered with *alang alang*, or long grass. The apparent spread of these grass patches, and the corresponding deforestation have caused the Government some anxiety. As yet, however, this aspect of the matter has made no appeal to the native. The grass patch, entirely unproductive as it is, and almost invincible to cultivation, yet provides an annual supply of game when it is burnt off by the hunting party. It seems, indeed, as if the grass were regarded in the light of a special asset to its owners.

Fauna

Of the wild animals which these burnings drive into the nets of the hunters most important is *sus papuensis*, that fierce long-legged animal which abounds throughout Papua. But there is an unclassified multitude of marsupials ranging downwards in size from the wallaby, all of which are welcome to the Orokaiva, who despises no meat that comes his way. Of the tree-climbing marsupials the most notable is the cuscus, with beautifully dappled fur of white, yellow, and brown, which is cut into strips and worn in long streamers from the armlet of the warrior; and in the hills a larger animal, the tree-kangaroo, whose rich brown fur is used for the same purpose. Most beautiful of all is the

2: Williams E, G-5 (1923-1925) 1928
OJ23 Orokaiva OJ23

2. *Environment and the Food Quest*

133 The Northern Division, peopled by the Orokaiva, is one of the favoured regions of Papua. From mountain boundaries on the inland side—the Central Range on the west, Lamington and the Hydrographers on the south—a wide alluvial plain slopes very gradually down to the sea. A number of rivers pursuing a north-easterly course and running almost parallel, divide this plain at curiously equal intervals: from south to north they are the Girewo, Kumusi, Opi, Mambare, and Gira. Except for abrupt but shallow river terraces and a few island hills, this northern plain is almost flat with a hardly perceptible seaward slope. Viewed in the afternoon from one of the hills on its western border and dimmed slightly by a tropical haze, it resembles a perfectly calm sea, whose further margin fades unnoticed into the real sea on the east.

Whereas the foot-hills of the Central Range rise somewhat steeply from the level plain, those of Mount Lamington and the Hydrographers descend in a broad comfortable sweep intersected by ravines and bounding rivulets. Thickly populated and with innumerable garden-clearings, this piedmont area of the Northern Division is perhaps one of the most fertile and beautiful in all Papua.

134 But though here the soil is comparatively rich and well drained, it is often of poor quality on the plain proper. Sometimes sandy it is more often soggy and clayey, and where the vegetation is cleared it will become in the dry weather a hard, light-coloured earth—so hard as almost to defy the gardener's simple digging-stick. On the

137 lower reaches of the rivers are stretches of sago swamp of an extent not fully known; and along the coast belts of nipa and mangrove.

By far the greater part of the Northern Division is covered with forest. Very extensive areas have been at one time or another cleared for gardens, and here the timber is lighter, and from the forester's view-point

2: Williams E, G-5 (1923-1925) 1928
OJ23 Orokaiva OJ23

probably useless. In the neighbourhood of Dobodura behind Buna and of Ambasi in particular, but sporadically over the whole Division, are to be seen wide stretches of grass country,[1] very beautiful with their copses and belts of wood, but at present entirely unproductive, save that they harbour a good deal of game which is hunted at the annual burning.

The climate in the Northern Division is not worse than elsewhere in Papua. The two seasons are well enough defined though the accepted names 'South-East' and 'North-West' are scarcely applicable in this part of the territory. Indeed, the interior of the forest-covered plains seems seldom visited by strong winds from any quarter, and on either side of the track high trees will stand in an almost absolute stillness. When occasionally some overhead wind swoops down, it may do so with great violence, overthrowing the shallow-rooted trees or tearing down a litter of feebly-resisting branches.

The natives call the South-East season *Twira*, because it is first announced by the scarlet blossoming of the *Twira* tree, one of many that blush unseen by an unobservant European. It is a season of comparatively dry clear weather, sometimes of drought; of many brilliant days and star-lit nights, when one may be glad of a blanket; of dry tracks and transparent, fordable streams. The North-West they call *Tuperi*. This is the time of rains and plenty. The nuts of the *Tauga*, which blossomed at the beginning of the South-East, begin to fall. The weather is more oppressive and almost every evening the thunder is rumbling in the valleys of the range. The rain comes down towards evening, there are heavy falls in the mountains, and the rivers are brown and swollen.

The river may rise with extraordinary swiftness. Splashing over a shallow bed of rocks and pebbles, or pausing in some quiet pool overhung by trees but

[1] The grass referred to (*Imperata arundinacea*) is commonly known in Papua as *Kunukuru*, or 'pale grass'. It is presumably identical with *alangalang* and grows to a height of 5 feet or more.

2: Williams · E, G-5 (1923-1925) 1928
OJ23 Orokaiva OJ23

western part of the Division, it cannot be said that sago is anywhere scarce. The mode of preparation is simple and expeditious: it consists in kneading and watering the pith which has been scraped from the trunk, in allowing the sago to be carried off in suspension, and in leaving it to settle in a trough. The apparatus is prepared almost wholly from parts of the sago palm itself, and, except for the scraper and a strainer or sieve of coco-nut fibre, may be extemporized on the spot. The finished product is known as 'wet' sago, being a solid block of which the surface is hardened and glazed by scorching. The natives do not find it necessary to dry the product for their own use, and probably know nothing of the process. In the inland districts where the trees are sometimes individually owned sago is highly prized, and young palms, I am told, may be transplanted. In the large swamps the system is one of clan ownership, and as far as I know there is no sort of culture of the palms.

As a collector the Orokaiva is again an opportunist. Only in time of scarcity, it would appear, does he or his wife go out expressly to gather fern fronds and leaves—the pidgin English 'cabbage'; but wherever he goes he keeps his eye open for food—honey (for which he will fell a tree and smoke out the bees), clusters of somewhat insipid wild figs, nuts, snails, even a nest of flying ants.

He has certain trees, however, which afford a regular supply of food, viz. bread-fruit in several varieties, the *Tauga* nut, and the cycad *Puga*. The bush does not abound in fruit: of the numerous representatives of the genus *Ficus* only a few are edible, none very tempting, and the wild mango is comparatively rare. There are some poisonous fruits and plants, chief among them the creeper called 'New Guinea Dynamite', used by the natives for fishing and suicides. But they have definite opinions as to what may be eaten and what must be left alone, being presumably brought up to this knowledge. I have seen a little child scolded for mouthing a leaf of 'New Guinea Dynamite' growing in the village. Although

2: Williams E, G-5 (1923-1925) 1928
OJ23 Orokaiva OJ23

137 edible fruits are rare, there is a very fine red or yellow
262 ball called *Hega* which is plentiful and which annoys the thirsty traveller by its resemblance to an orange. It is in fact, as the natives say, only food for devils.

3. *Garden Products: their Introduction and Distribution*

244 The products of native horticulture in the Northern Division may be roughly classified. The list opposite is fairly complete in the more important items.

In addition to the list there are some garden herbs and plants used as spinach, or flavouring to the cooked taro. The native names of the most important, as far as I know them, are *Ombi*, *Taramu*, and *Nyaditi*. Lastly,
247 there is a list of ornamental plants—croton in countless varieties, striated dracaena, crimson amaranth, and flame-coloured or magenta coxcombs—which add much to the brightness and charm of a village or a sunny garden-clearing, and which have in some cases a magical as well as an ornamental value; and besides these a number of scented plants which a native loves for their own sake and for the seductive fragrance which is meant to make him an irresistible lover.

244 If we select the products which are of real importance to the Orokaiva they will make a much shorter list. They
245 are taro (the staple diet), yams, and sweet potatoes (both of them no more than subsidiary), *ina* and sugar-cane, bananas and plantains, coco-nut and betel palms.

244 The Orokaiva are essentially taro people. The plant is grown universally and in a great number of varieties.[1] It is easily cultivated, nutritious, and, prepared by a native housewife, very appetizing. The cook's habit of
252 spraying condiments out of her mouth over the pot may daunt the inquisitive European who would otherwise be willing to sample her work, but there is no denying

[1] I have the names of seventeen varieties, distinguishable by various properties of leaf, stalk, tuber, &c. There are no doubt many more. Codrington notes the great variety of taro. Of yams, incidentally, he listed no less than eighty varieties in the small island of Mota (Codrington, *Melanesians*, pp. 304, 319).

2: Williams E, G-5 (1923-1925) 1928
OJ23 Orokaiva OJ23

undergrowth are burned in the clearing. It is the custom to cut trees at a height of three or four feet from the ground, no doubt because this is easier. The resultant forest of stumps may look somewhat untidy, but they are regarded less as obstacles than as conveniences—pillars for the trailing yams, props for the sugar-cane, hat-stands and clothes-horses on which a man may hang his knitted bag in order to keep an eye on it, or a woman her sole garment, the bark-cloth skirt, for greater freedom when working alone at her weeding. The roots are not grubbed, and the soil, though superficially clean, is full of potential rivals for the vegetables which are soon to be planted.

There is a matter associated with clearing and the Rotation of Areas which has long been a cause for some anxiety. This is the spread of the grass plains [1] and the consequent deforestation of certain parts of the Division. It may be worth while putting down the result of my own observations in this matter, though they are not those of a botanist or a forester.

The grass lands are particularly noticeable in the Dobodura district, and to a less extent around Ambasi; but farther inland they are again very prevalent along certain parts of the river Kumusi and here and there along the Mamba and Gira. I have always assumed that some at least of the wide tracts of *kurokuro* are natural. The fact that they are frequently met with along the river banks, where there are here and there distinct evidences of terracing, suggested that in some cases a newly deposited river-flat might happen to be clothed with long grass rather than with bush. However, the question whether the grass is natural or no need not really concern us.

The practical issues are whether the grass country is extending, and, given that it is, what are the causes for its extension. From native informants—whose word may certainly be accepted in such a matter—I have definite instances in which the bush has encroached upon

[1] Vide p. 111, note.

2: Williams E, G-5 (1923-1925) 1928
OJ23 Orokaiva OJ23

137 and finally enveloped former grass patches, and definite instances on the other hand in which the grass has ousted the bush. The Resident Magistrate's observations, however, extending over a good many years, compel us to conclude that the latter process is unfortunately by far the stronger.

The fact seems to be that, if they are left entirely to themselves, the surrounding bush does slowly overcome the grass. But owing to two kinds of human agency, the grass not only holds its own but actually makes headway through the forest. The first agency is fire. At the annual burning of a grass tract by the hunters, the fire sweeps across the open and breaks upon the barrier of trees like a huge wave upon the rocks. After the burning the forest trees are scorched and withered; they have probably received a set-back, while the grass springs up again as green and stubborn and useless as ever.[1]

137 241 The other agency is that of the garden. In the proper sequence of events the taro crop should be succeeded by a vigorous growth of weeds, bushes, and young saplings. This is simply left to itself and presently changes into light bush, which is eventually cleared and planted again. But, as the natives will say, the grass is sometimes 'too strong'; it conquers the young growth, and instead of bush we find in the end a grass patch.

The work of weeding is not done thoroughly. Too often one may see a garden fairly bristling with stalks of self-sown *kurokuro*, their beautiful pale plumes swaying gently in the breeze and scattering seeds among the taro. Not the method of clearing in itself, but this subsequent carelessness, is what brings the grass patch into the forest. The fault is with the native: as Job would have told him, he has 'let thistles grow instead of wheat and cockle instead of barley'. It will need another Job, per-

[1] Sometimes I have seen a small fire in the primary growth which ensues after the taro is taken up and the garden abandoned. This is either merely purposeless or else to drive out game; never with the idea of immediate recultivation. Happily it is rarely seen, though it may well be an additional influence in favour of the long grass.

2: Williams E, G-5 (1923-1925) 1928
OJ23 Orokaiva OJ23

sonified perhaps in the Agricultural Expert, and with the patience as well as the invective powers of the original, to arrest this gradual spread of the long grass.

While we may absolve the land system, viz. the Rotation of Areas, from direct responsibility for the deforestation of the northern plains, it will be obvious that it is in other respects a very wasteful one, especially in that it requires so great an extent of land to support the individual. Perhaps a more serious objection to the system is its unsettling influence on the social life of the natives. These questions will be referred to again. In the meantime I may proceed to describe the routine of the native garden.

6. *The Horticultural Routine*

(*a*) *Preparation of Ground and Fertilizing.* The ideal ground for planting is, in native estimation, absolutely bare. The debris of undergrowth and dried leaves is brought together in heaps and burned. The ash is ordinarily left where it stands in little piles; but a more than usually neat gardener would gather it up and throw it away into the bush.

I have come upon a whole village preparing ground for rice on the river Eia. The rice was a Government experiment; the village constable was a smart man and conscientious, and the whole community was with him in desiring to do its best to make the rice a success and to earn the approbation of the magistrate. Consequently they had taken somewhat unusual pains in preparation for the planting. When I saw it the earth was almost as bare, brown, and vegetationless as a State School playground. The litter of dry leaves, grass, and so forth was being meticulously removed, and, where some had been burnt, even the ashes were scraped together into wooden pig-dishes, carried off, and, with exemplary tidiness, thrown into the river.

This practice of removing all waste vegetable material from the ground may mean that there is less weeding to